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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/770,619	02/02/2004	Yoshinori Tsubaki	04072/HG	2307

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EXAMINER	
SCHWARTZ, PAMELA R	
ART UNIT	**PAPER NUMBER**
1774	

DATE MAILED: 08/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/770,619	TSUBAKI ET AL.	
	Examiner	Art Unit	
	Pamela R. Schwartz	1774	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19 and 21* is/are pending in the application.

4a) Of the above claim(s) *17-19* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16 and 21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-19 and 21* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. This office action is intended to replace the office action of &/29/06 and to restart the period for response.

2. The examiner has carefully considered the entire record, including applicants' remarks and declaration filed with the most recent response. Upon careful reconsideration of the Held reference, the examiner believes that the ratios presented at col. 10, lines 7-11 of the reference must be in error because they are inconsistent with the examples and unsupported at any other point in the specification. Consequently, all rejections over Held et al. have been withdrawn. Due to the breadth of some of the claims, however, the examiner has determined that the following rejections are applicable. It is noted that some of the claims have only been rejected under provisional obviousness type double patenting.

3. Claims 1-5, 8-12 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda et al. (6,562,441) in view of Liu et al. (US 2003/0099816). The reference discloses a recording medium comprising a coating layer on a base material. The coating is a porous ink receiving layer formed from an aqueous composition comprising 100 parts by weight of a fine pigment of average diameter not larger than 1 micron and pore volume .4 to 2.5 ml/g and 1 to 100 parts by weight of a hydrophilic resin capable of forming a hydrogel by electron beam irradiation (see the abstract). The diameter of secondary particles is preferably 9 to 700 nm (col. 7, lines1-8). The hydrophilic polymer may have side chains introduced by graft polymerization (col. 7, line 66 to col. 8, line 30). The polymerization degree is not disclosed but overlaps with the claimed range since the molecular weight of the resin is disclosed as

in a range to 10,000 to 5,000,000 (col. 8, lines 37-52). The reference also does not disclose the modification ratio, but it would have been obvious to one or ordinary skill in the art to determine the degree of modification required to have the resin form a hydrogel in accordance with the reference (col. 8, lines 31-36). Preferred amounts of the resin are as small as possible (col. 9, lines 22-42). The pore volume of the ink receiving layer is disclosed as ml/g (col. 9, lines 43-57). Based upon this disclosure, it would have been obvious to one of ordinary skill in the art to optimize pore volume to provide the desired amount of ink absorption capability in the layer. The reference discloses that inorganic salts may be included for their cationic characteristic (col. 10, lines 20-41). Such materials are also well known to those of ordinary skill in the art as multivalent metal compounds.

Liu et al. disclose an ink jet recording material containing silica. The silica may be made by a wet process, including the gelation method, or a dry process [0048-0049]. The silica may have a BET specific surface area of 25 to 400 m^2/g [0050]. The reference discloses pulverizing or dividing particles that are larger in size than desired due to agglomeration of primary particles [0057, 0061, 0062, 0064]. The reference discloses desired sizes of secondary particles of 10-300 nm and 5-30 nm for primary particles [0064-0066]. While the reference does not disclose a coefficient of variation in primary particle distribution, it discloses determining the particle size of the primary particles [0063] and the importance of maintaining primary particle size in specific ranges [0066]. Since it is known in the art to control particle size distribution in order to control the size and shape of pores formed between the particles, it would have been

obvious to one of ordinary skill in the art, from the disclosure of the reference at [0066] to narrowly control particle size distribution in order to obtain desired and favorable ink absorption characteristics. It would have been obvious to one of ordinary skill in the art to select a silica from those disclosed for use in this art by the secondary reference since particulars for the silica of the primary reference were not disclosed and since the silica of the primary and secondary reference serve equivalent purposes in the recording layers of the references.

4. Claims 6, 7, 10 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda et al. (6,562,441) in view of Liu et al. (US 2003/0099816) and further in view of Kobayashi et al. (6,761,941 or 5,612,281).

The Kobayashi et al. references each disclose gas-phase silica for inclusion in ink jet recording layers. They do not specifically disclose a ratio of isolated silanol groups but they teach the number of silanol groups/nm^2 (see col. 6, lines 27-52 of '281 or col. 8, lines 25-52 of '941). These references teach that silica with low surface silanol density results in a highly porous structure. Based upon these teachings, it would have been obvious to one of ordinary skill in the art to select a gas-phase silica with low surface silanol density as the silica of the primary reference in order to form a layer of high void volume. With respect to particles size, '941 specifically sets forth the primary particle size at col. 8, line 65 to col. 9, line 6. '281 teaches the size of the secondary particles at col. 6, lines 53-67. From this disclosure, it would have been obvious to one of ordinary skill in the art that the primary particles had to be very small, on the order of a few nanometers, and in a range overlapping with that instantly claimed.

5. Claim 1-5, 14-16 and 21 are is rejected under 35 U.S.C. 103(a) as being unpatentable over Hann et al. (6,838,136) in view of Liu et al. (US 2003/0099816). The primary reference discloses an ink jet recording sheet having a substrate coated with a radiation curable material and particulate material wherein the ratio of particulate material to radiation curable material is greater than 1:1 (col. 2, lines 40-48). The radiation curable material is a difunctional urethane acrylate and the particulate material may be precipitated silica, silica gels or fumed silica with a particle size of 300 nm or less (col. 3, lines 5-49). The support may be non water-absorptive (col. 4, lines 3-51). The medium will inherently have a capacity as set forth in claim 1 because the medium is porous with a particle to binder ratio consistent with the instant claims.

Liu et al. disclose an ink jet recording material containing silica. The silica may be made by a wet process, including the gelation method, or a dry process [0048-0049]. The silica may have a BET specific surface area of 25 to 400 m^2/g [0050]. The reference discloses pulverizing or dividing particles that are larger in size than desired due to agglomeration of primary particles [0057, 0061, 0062, 0064]. The reference discloses desired sizes of secondary particles of 10-300 nm and 5-30 nm for primary particles [0064-0066]. While the reference does not disclose a coefficient of variation in primary particle distribution, it discloses determining the particle size of the primary particles [0063] and the importance of maintaining primary particle size in specific ranges [0066]. Since it is known in the art to control particle size distribution in order to control the size and shape of pores formed between the particles, it would have been obvious to one of ordinary skill in the art, from the disclosure of the reference at [0066]

to narrowly control particle size distribution in order to obtain desired and favorable ink absorption characteristics. It would have been obvious to one of ordinary skill in the art to select a silica from those disclosed for use in this art by the secondary reference since particulars for the silica of the primary reference were not disclosed and since the silica of the primary and secondary reference serve equivalent purposes in the recording layers of the references.

6. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hann et al. (6,838,136) in view of Liu et al. (US 2003/0099816) as applied above, and further in view of either patent to Kobayashi et al. (6,761,941 or 5,612,281).

The Kobayashi et al. references each disclose gas-phase silica for inclusion in ink jet recording layers. They do not specifically disclose a ratio of isolated silanol groups but they teach the number of silanol groups/nm^2 (see col. 6, lines 27-52 of '281 or col. 8, lines 25-52 of '941). These references teach that silica with low surface silanol density results in a highly porous structure. Based upon these teachings, it would have been obvious to one of ordinary skill in the art to select a gas-phase silica with low surface silanol density as the silica of the primary reference in order to form a layer of high void volume. With respect to particles size, '941 specifically sets forth the primary particle size at col. 8, line 65 to col. 9, line 6. '281 teaches the size of the secondary particles at col. 6, lines 53-67. From this disclosure, it would have been obvious to one of ordinary skill in the art that the primary particles had to be very small, on the order of a few nanometers, and in a range overlapping with that instantly claimed.

7. Claims 1-5, 14-16 and 21 rejected under 35 U.S.C. 103(a) as being unpatentable over Pekala et al. (WO 99/21723) in view of Liu et al. (US 2003/0099816). Pekala et al. disclose a radiation crosslinked printing medium having a water soluble binder, such as polyvinyl alcohol (p. 1, lines 19-24, p. 5, line 8 to p. 6, line 17) and filler particles (p. 9, lines 5- p. 12, line 20). The filler particles may be colloidal silica with a maximum dimension less that 100 nm. The filler may be 20 to 80 percent of the coating, therefore, at higher percentages of filler, the instant limitation to absorption capacity will inherently be met. The support may be non-porous (see p. 13, lines 13-15).

Liu et al. disclose an ink jet recording material containing silica. The silica may be made by a wet process, including the gelation method, or a dry process [0048-0049]. The silica may have a BET specific surface area of 25 to 400 m^2/g [0050]. The reference discloses pulverizing or dividing particles that are larger in size than desired due to agglomeration of primary particles [0057, 0061, 0062, 0064]. The reference discloses desired sizes of secondary particles of 10-300 nm and 5-30 nm for primary particles [0064-0066]. While the reference does not disclose a coefficient of variation in primary particle distribution, it discloses determining the particle size of the primary particles [0063] and the importance of maintaining primary particle size in specific ranges [0066]. Since it is known in the art to control particle size distribution in order to control the size and shape of pores formed between the particles, it would have been obvious to one of ordinary skill in the art, from the disclosure of the reference at [0066] to narrowly control particle size distribution in order to obtain desired and favorable ink absorption characteristics. It would have been obvious to one of ordinary skill in the art

to select a silica from those disclosed for use in this art by the secondary reference since particulars for the silica of the primary reference were not disclosed and since the silica of the primary and secondary reference serve equivalent purposes in the recording layers of the references.

8. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pekala et al. (WO 99/21723) in view of Liu et al. (US 2003/0099816) as applied to claims 1-4 above and further in view of Kobayashi et al. (6,761,941 or 5,612,281).

The Kobayashi et al. references each disclose gas-phase silica for inclusion in ink jet recording layers. They do not specifically disclose a ratio of isolated silanol groups but they teach the number of silanol groups/nm^2 (see col. 6, lines 27-52 of '281 or col. 8, lines 25-52 of '941). These references teach that silica with low surface silanol density results in a highly porous structure. Based upon these teachings, it would have been obvious to one of ordinary skill in the art to select a gas-phase silica with low surface silanol density as the silica of the primary reference in order to form a layer of high void volume. With respect to particles size, '941 specifically sets forth the primary particle size at col. 8, line 65 to col. 9, line 6. '281 teaches the size of the secondary particles at col. 6, lines 53-67. From this disclosure, it would have been obvious to one of ordinary skill in the art that the primary particles had to be very small, on the order of a few nanometers, and in a range overlapping with that instantly claimed.

9. Claims 1-5, 8-10, 14-16 and 21 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-27 of copending Application No. 10/699,343. Although the conflicting claims are not

identical, they are not patentably distinct from each other because the copending application claims an ink jet recording sheet having a support and a porous layer includes hydrophilic binder crosslinked with ionizing radiation and microparticles with a binder to particle ratio of 1:5 to 1:15. The binder polymer is crosslinked through side chains and has a polymerization degree as instantly claimed. While detail of the particles and support are not claimed, looking to the specification to see what is intended for the claimed support and particles, they are the same as instantly claimed [0069-0072, 0117].

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

10. Claims 1-5, 8, 9, 11, 12, 13, 15 and 21 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-5 of copending Application No. 10/886,433 in view of Liu et al. (US 2003/0099816). The copending application recites in its claims an ink jet recording sheet having a layer comprising a hydrophilic binder and an inorganic pigment that is gas-phase silica. The binder is recited as cross-linked with ionizing radiation. The claims of the application are directed to the same kinds of binder polymers with the same or overlapping polymerization degree and a plurality of side chains that are cross-linked to the main chain by UV radiation. It would have been obvious to one of ordinary skill in the art to control the ratio of side chains to the main chain in order to control the amount of cross-linking that occurs. Claim 5 of the copending application recites that the support is non water-absorptive.

Liu et al. is relied upon as in paragraph 2 above for the particulars of the silica which have not been set forth by the claims of the copending application.

This is a provisional obviousness-type double patenting rejection.

11. Claims 6, 7, 10, 13 and 16 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-5 of copending Application No. 10/886,433 in view of either patent to Kobayashi et al. (6,761,941 or 5,612,281).

The copending application recites in its claims an ink jet recording sheet having a layer comprising a hydrophilic binder and an inorganic pigment that is gas-phase silica. The binder is recited as cross-linked with ionizing radiation. The claims of the application are directed to the same kinds of binder polymers with the same or overlapping polymerization degree and a plurality of side chains that are cross-linked to the main chain by UV radiation. It would have been obvious to one of ordinary skill in the art to control the ratio of side chains to the main chain in order to control the amount of cross-linking that occurs. Claim 5 of the copending application recites that the support is non water-absorptive.

The Kobayashi et al. references each disclose gas-phase silica for inclusion in ink jet recording layers. They do not specifically disclose a ratio of isolated silanol groups but they teach the number of silanol groups/nm^2 (see col. 6, lines 27-52 of '281 or col. 8, lines 25-52 of '941). These references teach that silica with low surface silanol density results in a highly porous structure. Based upon these teachings, it would have been obvious to one of ordinary skill in the art to select a gas-phase silica with low

surface silanol density as the silica of the primary reference in order to form a layer of high void volume. With respect to particles size, '941 specifically sets forth the primary particle size at col. 8, line 65 to col. 9, line 6. '281 teaches the size of the secondary particles at col. 6, lines 53-67. From this disclosure, it would have been obvious to one of ordinary skill in the art that the primary particles had to be very small, on the order of a few nanometers, and in a range overlapping with that instantly claimed.

12. Claims 1-5, 8, 9, 11, 12, 14, 15 and 21 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over the claims of copending Application Nos. 10/643,349, 10/833,842, 10/855,525 and 10/823340 each taken in view of Liu et al. (US 2003/0099816). The copending applications recite an ink jet recording sheet having a layer comprising a hydrophilic binder and inorganic microparticles. The binder is recited as cross-linked with ionizing radiation. The claims of the applications are directed to the same kinds of binder polymers with the same or overlapping polymerization degree and a plurality of side chains that are cross-linked to the main chain by UV radiation. It would have been obvious to one of ordinary skill in the art to control the ratio of side chains to the main chain in order to control the amount of cross-linking that occurs.

With respect to 10/643,394, see claim 1 and the description of this embodiment at [0050-0052], 10/833,842, see claims 1-3, 10/855,525, see the claims and the description of the claimed embodiment at [0040,0049] and 10/823,340, see claims 1 and 2 and the description of the claimed embodiment at [0084]. It would have been obvious to one of ordinary skill in the art to determine the percentage of side chains on

the hydrophilic polymer in order to control the degree of cross-linking that occurs at these sites. In each case a non-water absorptive support is either claimed or described in the specification concerning the claimed embodiment of the invention.

In each case, the particles are disclosed to be silica. Liu et al. is relied upon as in paragraph 2 above for the particulars of the silica which have not been set forth by the claims of the copending application.

This is a provisional obviousness-type double patenting rejection.

13. Claims 6, 7, 10, 13 and 16 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over the claims of copending Application Nos. 10/643,349, 10/833,842, 10/855,525 and 10/823340 each taken in view of either patent to Kobayashi et al. (6,761,941 or 5,612,281).

The copending applications recite an ink jet recording sheet having a layer comprising a hydrophilic binder and inorganic microparticles. The binder is recited as cross-linked with ionizing radiation. The claims of the applications are directed to the same kinds of binder polymers with the same or overlapping polymerization degree and a plurality of side chains that are cross-linked to the main chain by UV radiation. It would have been obvious to one of ordinary skill in the art to control the ratio of side chains to the main chain in order to control the amount of cross-linking that occurs. With respect to 10/643,394, see claim 1 and the description of this embodiment at [0050-0052], 10/833,842, see claims 1-3, 10/855,525, see the claims and the description of the claimed embodiment at [0040,0049] and 10/823,340, see claims 1 and 2 and the description of the claimed embodiment at [0084].

The Kobayashi et al. references each disclose gas-phase silica for inclusion in ink jet recording layers. They do not specifically disclose a ratio of isolated silanol groups but they teach the number of silanol groups/nm^2 (see col. 6, lines 27-52 of '281 or col. 8, lines 25-52 of '941). These references teach that silica with low surface silanol density results in a highly porous structure. Based upon these teachings, it would have been obvious to one of ordinary skill in the art to select a gas-phase silica with low surface silanol density as the silica of the primary reference in order to form a layer of high void volume. With respect to particles size, '941 specifically sets forth the primary particle size at col. 8, line 65 to col. 9, line 6. '281 teaches the size of the secondary particles at col. 6, lines 53-67. From this disclosure, it would have been obvious to one of ordinary skill in the art that the primary particles had to be very small, on the order of a few nanometers, and in a range overlapping with that instantly claimed.

14. Applicant's arguments with respect to claims 1-16 and 21 have been considered but are moot in view of the new ground(s) of rejection. From applicants' showings in the declaration, it appears that the absorption is directly related to the ratio of particles to binder. Therefore, any of the media set forth above that disclose a particle to binder ratio as claimed are also considered to meet the new limitation added to the independent claims.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pamela Schwartz whose telephone number is (571) 272-1528.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena Dye, can be reached on (571) 272-3186. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PRSchwartz
August 22, 2006

PAMELA R. SCHWARTZ
PRIMARY EXAMINER